THE IMPORTANT ELEMENTS IN MODERN LAND CONFLICTS

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Were the time given me far longer than it is, it would be impossible to treat the subject of "The Important Elements in Modern Land Conflicts," even in the merest outline, since in reality it covers the whole scope of the art and science of war. The important elements, you may say, are those which are the most important to success; but in war all elements are essential, none can safely be neglected and those which to the casual observer may seem the most trivial are the most important of all. At this moment, somewhere in the Indian Ocean, not alone the relative valor and skill of Russian and Japanese sailors but the breaking of a propellor, the interruption of the electric current which works a gun turret or an ammunition hoist, the jamming and accidental explosion of a torpedo may, during the slow processes of centuries to come, give a new trend to the civilization of the world.

But I know very well that you have not come here to-night in the hope of hearing an abstract discussion of the relative degrees in which this or that element contributes to success in war, or the neglect of them, to disaster and defeat. I know very well what it is that makes an audience such as this, gathered in such a place, ready to listen to what may be said upon a subject so foreign to your daily business and studies, to your inherited and cultivated modes of thought. Your interest has been inspired by those tremendous events of recent occurrence and still occurring in the Far East, and that interest is accentuated by the knowledge that these events are not the incidents of a mere dynastic quarrel, a struggle of similar peoples over a boundary line, or one of those violent evidences which every civilization gives at times of its passage from its lower to its higher stages of development. You know that it is not one of those

struggles by which a civilization adapts itself, in a series of rude shocks, to a changed environment and thereafter, until new trammels are imposed requiring new violences to secure freedom of movement, moves by a slightly different path, but in the same general direction in its pursuit of higher and nobler ideals. On the contrary you feel that it is, possibly at least, one of those collisions which at epoch-making periods occur between different forms of civilization, the rare and terrible drama of civilization *vs.* civilization, of every act of which, for the first time in the history of the world, the whole race is a spectator. When, centuries ago, on the plains of Tours, Charles Martel beat back the wave of Moslem invasion, the world little knew and it required long years to realize that that event perhaps determined whether the civilization of the Crescent or the Cross should dominate in Europe. Shall Mukden and Liao Yang or some other, as yet unnamed, battlefield mark the limit of high tide to one of the two civilizations now opposing each other in the East and, if so, to which one? You remember those words of grave import which close one of the "Letters from a Chinese Official," addressed to all nations of the West; "In the name of Christ you have sounded the call to arms! In the name of Confucius we respond!" Are the tread of Japanese armies and the booming of Japanese cannon the first sound of the voice of a forerunner of Confucius sounding in the Wilderness of Manchuria?

Whatever we hope or fear, as to the result, it is this general idea which makes you willing to give one entire session of your annual meeting to the subject of war. And I have no doubt that in the minds of many of you there is an especially sad interest in the demonstration now being made before your eyes—and contrary to your hope and expectation—that war is still possible and that the character of the great epochs in the history of the world, the dominance of this or that form of civilization over parts of the human race or over the race itself may be determined through this horrible agency in the future as in the past. Therefore, I think it will be of interest and profit to devote a few moments to a hasty investigation, in the light of recent events, of the curious phenomenon that modern agencies of destruction render more rather than less possible conflicts of bodies of men armed with them. It will then appear that the relative importance of the elements which enter into such conflicts—organization and preparation in peace, the strat-

egy of the theatre of war, the grand and minor tactics of the battlefield, the value of the three arms—remain just what they were before.

It is not long since the late Professor Bloch published his celebrated book, entitled "The Future of War." It is said that its conclusions, more than anything else, influenced the Czar Nicholas to take the part which he did in the establishment of the peace tribunal at The Hague and in that respect at least the work was of lasting benefit to humanity. By an array of facts, incontrovertible by any other demonstration than experience, he proved that the last great war had taken place, that the presence of two hostile modern armies upon the same field was a physical impossibility, or that at the most there could be but one more such war in order to convince the world of the truth of his conclusions. He said, to quote his own words, "With the weapons now adopted the effectiveness of fire presents the possibility of total mutual annihilation." After making what he considered due allowance for the diminished effect of fire in battle as compared with the results of peace experiments, he shows that a body of 10,000 infantry cannot advance against another much smaller body over the average ground of a battlefield without losing, were that possible, more than its entire strength before reaching its enemy's position. He proves that artillery will be put out of action and unable to withdraw from the field by the fire of invisible riflemen, and that it is a physical impossibility for two men to approach each other to the point where either could use the bayonet. In a remarkable chapter entitled, "Does Russia Need a Navy?" he demonstrates that even for purposes of material aggrandizement she does not need one. He dismisses all those conditions which were being formulated as he wrote, and which are now being realized in Manchuria with these words:

"From the direction of Japan there can be no serious danger. The Amur territory of Russia is a wilderness which Japan cannot threaten. It is inc nceivable that she would enter upon a war with Russia even though she were possessed of a preponderance of battleships."

Well, that "inconceivable" war has now been waging day and night for more than a year; the thunder of Japan's cannon and the tramp of her armies are now reverberating in the valley of the Amur, and during every moment of this time the infantry, cavalry and

artillery of both Russia and Japan have been doing all those things so clearly proved to be physically and morally impossible.

The truth is terrible enough and always has been so; the picture presented by Professor Bloch would, if true, be still more terrible, but we do not stop often enough to think what the real grave import of its terror would be. He congratulated himself that what he believed were new horrors added to war would forever make war inconceivable and impossible. And many another kindly and gentle soul has cherished the hope that the fear and horror of it would accomplish what the spirit of love and reasonableness has thus far failed to do.

His conclusion results from an exhaustive study of the resisting force, the moralé, to be expected in an army of men of any Occidental nation. He assumed—what is true—that the army which is defeated, which retreats or surrenders, is a live army; that the dead and seriously wounded do neither of these things, but that the ultimate action of the uninjured men is determined by the effect upon their moral resisting force produced by the dead and wounded. He further assumes—which is equally true—that under given conditions there is an assumable limit when this resisting force begins to dissipate and that it is coincident with the moral effect produced upon the uninjured men by a certain percentage of casualities in dead and wounded. His ultimate conclusion is that the assumable limit has already been more than reached and he bases it upon two assumptions, first, the unquestioned increase in the power of military agencies for destruction, and second, an actual decrease in the moral resisting power of men of western races—their increasing repugnance to the idea of death and physical suffering, characteristic of their very civilization itself. The first of these latter two assumptions is, as we shall see, without foundation in fact. That the second one may be true is conceivable; but if true it is full of omen to those who speculate upon the fate of that civilization which we still hope may dominate the world.

Two facts connected with this matter we must not lose sight of. The first is that thus far there have always been at least two radically different forms of mentality or spiritual force—call it what you will—that have steadily impelled forward at least two radically different forms of civilization. Each of these either receives power from or gives force to its own peculiar forms of material and spirit-

ual philosophy. And all human history is made of the records, on the one hand, of the tremendous internal struggles which indicate the successive steps in the development of each of these systems; on the other hand, by the still more tremendous struggles which mark the collisions of the systems themselves. The second fact is that all the material advantages which result from the development of either system are readily communicated to and absorbed by the other without producing any necessary effect upon the peculiar modes of thought out of which this other grew. On any day you may enter a Pullman train in the city of Calcutta drawn by an American locomotive. In the coaches you meet gentlemen whose skin is of somewhat different hue from your own, faultlessly attired in western costume, who will converse with you in a western tongue about western customs, philosophies and forms of religion,—and who are being carried in that very embodiment of western Christian civilization to worship an idol in a temple of Delhi. At this moment the products of every western science, art and manufacture are being employed to make successful the advance of armies of Buddhism, Taoism and Confucianism. Of those who cherish the hope that western civilization may so reduce the moralé of its adherents that, combined with the anticipatory terrors produced by modern agencies of destruction, they will refuse to engage in any war at all, I ask whether that hope can be very consoling so long as these same agencies of destruction are in the hands of hundreds of millions of men whose moralé has not thus been reduced, and to whom the idea of death and physical suffering in advancing another antagonistic civilization is as the breath of their nostrils?

The error in all these assumptions as to the effect to be produced by modern weapons on the battlefield lies in the failure to observe that, under average conditions, the amount of loss that any body of men need suffer, depends entirely upon themselves. They can always either lie down or run away or surrender. And that is just what soldiers on one side or the other have done in every battle from the beginning of time. In every battle the agencies for destruction as used by one side have, at some point on the field, been more terrible than the other could endure. And if that point happens to be the critical, the all-important one, as in the nature of the case it generally is, that side is defeated.

But Professor Bloch's imagination conceived a picture of total

mutual annihilation along the entire line of battle. In his fancy he saw a modern battle as made up of an enormous number of duels, each between two men face to face and armed with perfect weapons. Even then an application of the mathematical laws of probability would place the average maximum loss of both sides combined at about 50 per cent. Curiously enough, we have to look backward to more barbarous ages and cruder weapons to approach a realization of his picture rather than to the present or future times with warlike appliances more nearly perfect. As a matter of fact there is no record of any land battle for centuries in which such a loss has occurred, while the percentage has been constantly decreasing and that of the war now progressing in the East has thus far been less than that of any previous great war.

I have spoken of the phenomenon, amounting to an actual law, that the percentage of casualities in battle, other things being reasonably equal, decreases in proportion to the perfection—length of range, accuracy and inherent destructive character—of the military weapons employed. Let us look at some of the historical facts which demonstrate this, beginning with about the time when the increasing perfection of fire-arms had caused such weapons to replace the hand weapons of mediæval and ancient times. From these we can easily trace the development of the law of which I speak.

The following is a table of the principal battles fought from the beginning of the Seven Years' War, in the eighteenth century, to and including the battle of Mukden, in the twentieth:

SEVEN YEARS' WAR.[1]

Battle.	Forces Engaged.	Percentage of loss.	Duration of battle.	Percentage of loss per hour.
Mollwitz	Austrian	24.0%	6 hours	4.0%
	Prussian	22.2%		3.7%
Chotusitz	Austrian	22.4%	4 "	5.6%
	Prussian	17.2%		4.3%
Hohenfriedberg	Austrian	20.0%	5 "	4.0%
	Prussian	6.0%		1.5%
Kesseldorf	Saxon	34.0%	2 "	17.0%
	Prussian	16.8%		8.4%
Rossbach	French	15.9%	1½ "	10.6%
	Prussian	2.4%		1.6%
Leuthen	Austrian	28.0%	4 "	7.0%
	Prussian	19.2%		4.8%
Zorndorf	Russian	42.7%	7 "	6.1%
	Prussian	33.8%		5.5%
Hochkirch	Austrian	15.0%	3 "	5.0%
	Prussian	24.0%		8.0%
Kunersdorf	Russian	26.4%	6 "	4.4%
	Prussian	43.2%		7.2%
Torgan	Austrian	29.0%	5 "	5.8%
	Prussian	32.0%		6.4%

WARS OF THE FRENCH REVOLUTION.[1]

Jemappes	Austrian	7.0%	7 hours	1.0%
	French	2.1%		0.3%
Neerwinglen	Austrian	6.4%	8 "	0.8%
	French	8.8%		1.1%
Fleurus	Austrian	4.5%	15 "	0.3%
	French	7.5%		0.5%
Trebbia	Allies	18.0%	30 "	0.6%
	French	21.0%	"	0.7%

NAPOLEONIC WARS.[1]

Austerlitz	Austrian	12.8%	4 hours	3.2%
	French	10.4%		2.6%
Jena	Prussian	19.8%	6 "	3.3%
	French	13.2%		2.2%
Eylom	Russian	27.0%	10 "	2.7%
	French	21.0%		2.1%
Borodino	Russian	33.0%	15 "	2.2%
	French	27.0%		1.8%
Waterloo	Allies	16.0%	8 "	2.0%
	French	24.0%		3.0%

[1] Col. Maude.

CIVIL WAR IN AMERICA.

Battle.	Forces Engaged.	Percentage of loss.	Duration of battle.	Percentage of loss per hour.
Gettysburg	Federal (88,289)..	26.05%	58 hours.	0.45%
	Confed. (76,727)..	29.8 %		0.51%
Seven Pines	Federal (38,000)..	14.0 %	23 "	0.6 %
	Confed. (50,000)..	16.0 %		0.69%
Spottsylvania	Federal (118,000)..	15.5 %	60 "	0.25%
	Confed. (91,000)..	9.8 %		0.16%
Wilderness	Federal (101,895)..	17.3 %	34 "	0.50%
	Confed. (61,025)..	18.0 %		0.47%
Antietam	Federal (75,316)..	16.4 %	17 "	0.96%
	Confed. (38,120)..	30.7 %		1.8 %
Chancellorsville ..	Federal (97,382)..	17.7 %	84 "	0.21%
	Confed. (57,352)..	22.2 %		0.26%
Chickamauga	Federal (58,222)..	27.7 %	38 "	0.73%
	Confed. (66,326)..	24.8 %		0.65%
Fredericksburg ...	Federal (113,987)..	11.1 %	16 "	0.7 %
	Confed. (72.497)..	7.3 %		0.46%
Manassas	Federal (75,696)..	19.1 %	64 "	0.3 %
	Confed. (48,527)..	18.8 %		0.29%
Second Bull Run ..	Federal (40,000)..	19.5 %	10 "	1.95%
	Confed. (65,000)..	6.0 %		0.6 %
Shiloh	Federal (62,682)..	20.8 %	41 "	0.5 %
	Confed. (40,335)..	26.5 %		0.64%
Stone River	Federal (41,400)..	32.0 %	60 "	0.53%
	Confed. (34,732)..	26.5 %		0.44%
Petersburg	Federal (63,299)..	18.0 %	60 "	0.3 %
(Assault)	Confed. (18,576)..	[2]		

WAR OF 1866.[3]

Königgratz	Austrian	11.0%	11 hours.	1.0%
	Prussians	33.0%		

WAR OF 1870–71.[3]

Wörth	French	16.0%	8 hours.	2.0 %
	Prussians	12.0%		1.5 %
Vionville	French	9.0%	10 "	0.9 %
	Prussians	22.0%		2.2 %
Gravelotte	French	5.4%	9 "	0.6 %
	Prussians	9.9%		1.1 %
Sedan	French	19.4%	12 "	1.6 %
	Prussians	6.0%		0.5 %
Beaune-la-Rolande	French	4.8%	8 "	0.6 %
	Prussians	2.0%		0.25%
Orleans	French	3.2%	20 "	0.16%
	Prussians	18.0%		0.9 %
Belfort	French	3.6%	36 "	0.1 %
	Prussians	5.8%		0.16%

[2] No record of losses.

[3] Col. Maude.

WAR OF 1877.[4]

Battle.	Forces Engaged.	Percentage of loss.	Duration of battle.	Percentage of loss per hour.
Plevna:				
First Battle	Turks	18.0%	4 hours.	4.5%
	Russians	28.0%		7.0%
Second Battle ..	Turks	19.0%	10 "	1.9%
	Russians	22.0%		2.2%
Third Battle ...	Turks	12.0%	60 "	0.2%
	Russians	18.0%		0.3%

ENGLISH BOER WAR.[4]

Modder River	British	7.0%	10 hours.	0.7%
	Boers	unknown		.....
Magersfontein	British	7.0%	10 "	0.7%
	Boers	unknown		.....
Colenso	British	6.0%	6 "	1.0%
	Boers	unknown		.....

RUSSO-JAPANESE WAR.

Battle.	Forces Engaged.	Percentage of loss.	Duration of Battle.	Remarks.
Yalu	Russian (20,000)	11.9 %	5 hours.	(With intermission
	Japanese (45,000)	2.3 %		of 3 hrs. after 1st 2 hrs. of battle.)
Nanshan	Russian (10,000)	8.3 %	13.5 "	(One division had
	Japanese (45,000)	9.3 %		been fighting intermittingly during preceding night, capturing Kinchow.)
Telissu	Russian (30,000)	16.0 %	10 "	(Advance guard action the preceding day of about 2 hrs. duration.)
	Japanese (45,000)	2.58%		
Kaiping	Russian (25,000)	0.8 %	.....	(Intermittent skirmishing through 3 days.)
	Japanese (60,000)	0.25%		
Fenshuiling ..	Russian (5,000)	4.0 %	30.5 "	(Fighting intermittent and by different columns on different portions of field.)
	Japanese (18,000)	0.4 %		

[4]Col. Maude.

Battle.	Forces Engaged.	Percentage of loss.	Duration of Battle.	Remarks.
Motieling	Russian (15,000)	6.6 %	11 "	
	Japanese (20,000)	1.4 %		
Hsioyen	Russian (8,000)	6.2 %	15 "	(Advance guard action on preceding day of about 4 hrs. duration.)
	Japanese (18,000)	2.9 %		
Tashihchiao ..	Russian (40,000)	1.6 %	22 "	(Battle kept up during night.)
	Japanese (60,000)	1.7 %		
Tomucheng ..	Russian (30,000)	3.4 %	14 "	(Some preliminary skirmishing the preceding day.)
	Japanese (30,000)	2.8 %		
Yashulintz {	Russian (40,000)	5.0 %	14 "	
Yangtsuling {	Japanese (45,000)	2.0 %		
Liaoyang	Russian (160,000)	5.4 %	10 days.	(Fighting on some part of the field nearly every night.)
	Japanese (170,000)	6.49%	10 hours.	
Sha River ...	Russian (180,000)	16.35%	11.5 days	(Fighting on some part of the field nearly every night.)
	Japanese (175,000)	5.8 %		
Sandepu	Russian (65,000)	23.0%	4 "	(Very fierce fighting on night of last day, also minor night fights.)
	Japanese (50,000)	14.0%		
Port Arthur .	Russian (45,000)	33.33%	.....	(Siege, about seven months.)
	Japanese (106,000)	42.6 %		
Mukden	Russian (400,000 about)	25.0 %	About 10 days.	(Including about 4 days' rear guard fighting.)
	Japanese (500,000 about)	12.0 %		

In the twelve principal battles of the Seven Years' War the average losses were,—victors 14 per cent., defeated 19 per cent. At Zorndorf the Prussians lost 33.8 per cent. and the Russians 42.9 per cent. At Kunersdorf the Prussians lost 43.4 per cent.

During the Napoleonic epoch an average of twenty-two battles gives victors 12 per cent. loss, defeated 19 per cent. At Aspern the French lost 46.8 per cent.

The average loss in four principal battles in the Crimea was for the victors 10 per cent., for the defeated 17 per cent. At Inkermann, the Russians lost 24 per cent.

The average of four principal actions in the Franco-Austrian War of 1859, gives for the victors 8 per cent. loss, for the defeated 8.5 per cent.

In twelve principal battles of the Civil War the losses of the

Union army amounted to 19.7 per cent. and of the Confederate armies to 19.6 per cent.

The average of six principal actions in the Austro-Prussian War of 1866 gives for the victors 7 per cent., for the defeated 9 per cent.

The average of eight principal actions of the first period of the Franco-Prussian War of 1870 gives for the victors 10 per cent., for the defeated 9 per cent. The heaviest loss in any one case was for the Prussians, 22.4 per cent. The average of three principal actions in the second period of the Franco-German War gives for the victors 2.5 per cent., for the defeated 3.5 per cent.

In fourteen battles in the present Russo-Japanese War (excluding the siege of Port Arthur) the average loss was for the Russians 9.5 per cent., for the Japanese 4.6 per cent. The heaviest loss in any one single battle was for the Russians at Mukden, 25 per cent., for the Japanese at Sandepu, 14 per cent.

An examination of the figures shows conclusively that the law deduced from the statistics of past wars and battles still holds true for the war now raging in the East. They show a steady tendency to decrease in the battle and still more in the hourly percentage of loss; so much so, that this total battle loss percentage in some of the more important battles in the present Russo-Japanese War, is less than the hourly loss in many previous battles since the general introduction of fire-arms. Where there is a temporary departure from the rule, it is to be explained by causes which in most cases are obvious. They show, together with this decrease in percentage of loss, a constantly increasing concentration of energy in the battle-field as represented by an increasing number of combatants engaged. Along with this they show the tendency of battles between these increasing numbers of combatants to increase in duration, lasting for days where they formerly lasted for hours, and all these changes are shown to go on *pari passu* with increased perfection in the weapons employed.

Now let us examine some of the interesting and instructive conclusions from the available data and upon which is based the law of tendency to decrease in losses. Just as the expert geologist, having before him a map which shows only the details of water courses, can read at a glance the general character of the country,—whether it is mountainous, hilly or plain, whether it is wooded or bare,

whether it is subject to rainy or dry seasons, and the geological nature of the soil; so the skilled analysist of these figures of losses in battle may read in them much of the history of these battles and of the wars of which they were incidents,—some idea of the relative numbers of the combatants engaged, the perfection of their fire-arms, the length of the combat, whether they were battles in open ground or whether one side was protected by intrenchments, the relative intensity of patriotism or other feeling which inspired the combat, and in some cases may even make an intelligent guess at the nationalities of the opposing armies.

(1) First, we note in connection with the tendency to diminished percentage of loss, the gradual disappearance of the individual duel element. Admitting that we have no accurate knowledge of the losses in ancient battles, we must nevertheless agree that these losses were relatively enormous unless we assume an inconceivable universal conspiracy among historians of all nations and ages to conceal the truth. Skill in generalship and dexterity on the part of the individual soldier being approximately equal, these great losses are to be explained as the result of two very evident causes. When bodies of men armed with missile weapons of short range, ultimately resorting to hand weapons, approach each other, the combat soon resolves itself into a mêlee and a series of individual duels. In such a combat it is almost certain that at least one of each two duelists will be disabled. I have already pointed out that in a struggle of two bodies of men the fact which causes one side to yield is the moral effect upon uninjured men by the contemplation of the casualities about them; but when a combat of large bodies is really an aggregation of duels of individuals, the combatants have little opportunity to observe the casualties and the moral depression which precedes defeat is the longer delayed. In a duel the moral depression which either combatant feels results from the injury which he himself receives and not from the contemplation of that produced on others. When at length this moral depression permeates one or the other of these bodies of men in its entirety, it is about as dangerous to retreat as to continue the fight. There is little more than the difference between being struck in the front or in the back. There can be no doubt, therefore, that the great losses in ancient battles were due to a combination of these two causes, first, the intensity of feeling aroused in the individual in hand-to-hand com-

bat, and second, the inability of either side in retreating to withdraw itself immediately from the destructive action of its opponent. Ancient battles were singularly devoid of key points in the modern sense of the word, where the greatest energy of attack and defense was concentrated and of the struggle at which a large part of the army was merely a spectator. They were, rather, an exhibition of pure brute force between individuals composing, in the aggregate, large bodies. No man played his part properly unless he made a hit upon the body of an antagonist; whereas, in a modern battle it requires the combined efforts of many men through a long day's fight to make a hit upon the body of one antagonist. Such were the battles of Hannibal, Alexander and Cæsar. There can be no doubt that, other things being equal, to that intensity of feeling engendered by personal encounter, combined with inability to quickly and safely withdraw from the immediate presence of a superior antagonist, was due the fact that in the battles of former ages men endured a loss greatly in excess of the normal average that troops in that age would have willingly endured, or will now endure, provided the character of their weapon be, as it really is, such as to weaken the nerve rather than excite the individual passions and at the same time to permit a ready withdrawal from a superior foe. There have been, and will be on all modern battlefields, points where there is a tendency to revive the ancient conditions, and these are the points where closest contact of the opposing forces is obtained, where the element of the duel comes into play, where the intense temporary passion of the combatants maintains for the longest time the mental exaltation which counteracts physical depression, where it is as dangerous to retreat as to stand fast or even advance,—and it is at these points, you will observe, that the greatest loss is still habitually suffered.

Now, to whatever extent is valid this explanation of abnormal loss as due to the existence of the personal duel element, we should expect a further demonstration of it as the individual duel element disappears with perfection in range and accuracy of the weapons employed. You will note, however, that when we go back to the Seven Years' War in the time of Frederick the Great, this element had by no means disappeared. The infantry fire-arm was what was familiarly known as the "Queen Bess" model. It was a long, heavy, smooth-bore, flint-lock musket. Troops of all nations were

armed with it. The caliber varied with the different nations with the object of preventing an enemy using his own ammunition in captured muskets, or using captured ammunition in his own muskets. In those days parallel lines of infantry of four, three and two ranks,—that is to say with the density of from 10,000 to 5,000 men per mile,—approached each other to a range of twenty yards before firing. At that range a bullet was just as dangerous as one from the most perfect modern rifle. At that range, moreover, it was only a matter of a second or two to come to a hand-to-hand combat, when the old element of the duel was completely revived.

The principal military fire-arm continued of this general character, with the eventual substitution of the percussion cap for the flint-lock, until the war of 1859 between France and Austria, when for the first time we find great powers using the muzzle-loading rifle. It was with this arm that for the most part our Civil War was fought. In the Austro-Prussian War of 1866, the Austrians were armed with the muzzle-loader, while the Prussians were armed with the breech-loader—the old needle gun—which they had used in the Danish War of 1864. There was little difference in the effectiveness of these arms at that time, the principal advantage of the breech-loader consisting in convenience in loading. Both sides in the Franco-Prussian War of 1870-71 were armed with the relatively defective breech-loader of that day. The Russo-Turkish War of 1877 found the two armies armed with a vastly improved breech-loader, while the Spanish-American War of 1898, the English-Boer War in South Africa and the present war in Manchuria, found both sides with the high-power, small-caliber, magazine breech-loader in its present perfect form. With all these improvements the range at which troops habitually fight gradually increased and the individual duel element gradually disappeared, until we find a curious revival of it brought about, strange to say, by the very perfection of the weapon, in the night combats which have been one of the strange features of the present war between Russia and Japan. In spite of this revival and for reasons to be given, the general law of decrease in percentage of loss accompanying perfection of fire-arms holds true. To sum up what has been said in regard to this individual element, you will observe that the principal difference in this respect between an ancient and a modern battle is that, whereas in the ancient one the death grapple extended

from end to end of the line, in a modern one large parts of the two armies are simply sparring with each other, endeavoring to hold each other fast, while the whole intensity of the struggle is concentrated at perhaps one point.

(2) The second instructive point to note is that with the tendency of decrease in percentage of loss there is a tendency to increasing concentration of energy on the battlefield as represented by increased numbers of combatants, and the strange fact is that this increase in concentration of energy is itself one of the causes of decrease in loss. You will be better prepared to understand this if you will keep in mind that strategy, grand and minor tactics,—now and at all times have been alike in basic principle,—they are merely the application of the laws of mechanics to the theatre of war and the battlefield. They all consist in the determination of the amount of a given power and the application of it at a certain point to perform a certain work in overcoming a calculated resistance. With every machine there is one principal point of application of the power, although at others much work both useful and useless may be done. It is at this point that the principal resistance is encountered, that the most friction and heat are developed, where the machine is most wracked and most rapidly wears away. So in a battle, there may be an exhibition of more or less destructive energy over miles of front while the real work is being done perhaps along a line of one hundred yards. It is here that the application of power results in the greatest waste of material. It is this concentration of destructive energy within a small space which seems so appalling and the mental effect of which, as we read of it, we instinctively but incorrectly extend over unduly wide limits. In fact the correct impression of the relative intensity of any modern war is given only as you keep in mind the relative concentration or dispersion of energy. Let us take, for illustration, a time in our Civil War when the front line, the actual fighting line of the Federals extended from the shore of the Chesapeake through Virginia, West Virginia, Kentucky and Tennessee to the mouth of the Mississippi, confronted along the entire line by the Confederate armies. You know what armies these were, the bloody battles they fought through a whole year's campaign and what losses they suffered, but you cannot gather within the limits of your mind at one time the impression as one whole produced by this dispersed battle-energy.

Now imagine some power to press in the flanks of these two vast lines towards the centre until both are concentrated along a line of some ninety miles in length, and the energy thus concentrated would still be less than that represented by the opposing Russian and Japanese armies at the recent battle of Mukden. But suppose the concentrated energy at the battle of Mukden to be the same as the sum of the dispersed energies on that long line of Federals and Confederates. You will ask why should not the concentrated loss be at least equal to the sum of the dispersed losses? The first reason is this,—another will be given in its proper place. If two opposing bodies of half a million men each be each divided into five separate and distinct armies of 100,000 men each and these fight five separate battles, there are at least five separate key points to be defended and captured and on the defense or capture of which everything depends. Now an army of 100,000 can and will bring as many men for useful work in the defense or capture of such a point as an army of a million men can do. On the other hand, if each five of these armies be concentrated into one it is still probable that there will be only one key point and the total energy concentrated at it cannot possibly be greater than if the armies were very much smaller.

Thus in the battle of Zorndorf fought against the Russians by Frederick the Great in the Seven Years' War, the losses were respectively 33.8 per cent. and 42.7 per cent. out of 37,000 and 50,000 men engaged on the two sides.

Through the Napoleonic wars, our Civil War, the Franco-Prussian War, the tendency has been to concentrate increasing numbers of men upon the decisive battlefields of a war with diminishing percentage of loss until we come to the recent battle of Mukden in which the victorious Japanese lost 12 per cent., and the percentage of loss of the defeated Russians was less than that suffered by one side or the other in numerous battles of our Civil War.

Again, this concentration of energy results in a less percentage of the total death loss in a given war. The one important respect in which the Civil War in America differs from all others in modern times is the wide dispersion of energy over an enormous theatre. In other wars each nation has combined all its power in one army operating on one line against one hostile army. The culminating decisive defeat for either ends the war. The law of mechanics holds true in such a case, the concentration of power is accompanied by the

minimum waste of material. In the Crimean War the allied armies lost 3.2 per cent. in killed and died of wounds; in the war of 1866 the Austrian army lost 2.6 per cent.; in the Franco-Prussian War of 1870-71 the Germans lost 3.1 per cent. All of these wars represent concentrated energy; in the American Civil War which represented dispersion, the Union armies lost 4.7 per cent. in killed and died of wounds and the Confederates lost over 9 per cent. And there is no reason to suppose that the present Russo-Japanese War will show a departure from the law.

Still keeping in mind the analogy between a body of men in battle and a machine performing work, and remembering that the power is applied in either case on a relatively small area, you would expect the percentage of loss in battle to be great in proportion—within reasonable limits—to the smallness of the organization. Statistics support this and it is a further confirmation of the law of which we have been speaking. In the Civil War there were regimental losses at critical parts of the field of between 80 and 90 per cent. and we have no reason to believe that there have been any greater losses in the war in Manchuria; the maximum loss in any brigade composed of several regiments was between 60 and 70 per cent. and the maximum loss in a division of several brigades was between 50 and 60 per cent.

Finally, this dispersion of energy and its attendant results is illustrated by the fact that in our Civil War there were 112 battles, properly so-called, and 1,882 battles and large and small engagements, while in the present war in Manchuria there have been only fourteen engagements—excluding the siege of Port Arthur—important enough to receive a name.

All of this has an important bearing in the interest of humanity. In a struggle between two nations one or the other yields for the same reason that one of two armies on a battlefield yields,—from the moral depression produced by the physical evidences of loss. This depression is the greater when all these physical evidences are centered at one spot which theretofore was also the one center of hope. We sometimes speak of the battle of Gettysburg as a decisive one, but it was not decisive in the sense that we here mean. There were too many other centers of hope, and the depression of defeat at one place was counteracted by temporary success at another. So in the present war the dispersion of energy on sea and land un-

doubtedly operates to delay the result. The depression following Mukden is partly offset by the hopes centered in the fleet.

(3) There is another reason why, in advance of more accurate statistics, we have a right to assume that the present war in Manchuria will show a great decrease of death loss from wounds received in a battle. When you read the figures giving the number of casualties in any battle in past times, you know that they represent a certain proportion; for every man killed or who dies of wounds within twenty-four hours after they are received, there are four or five or even more of these reported only wounded. Of the men who receive what were mortal wounds in the past and of those less severely wounded, a constantly increasing proportion recover. The old small-arm projectile made great ragged wounds. They killed in many cases by shock. The soldier died from loss of blood, unable to apply the simplest remedies that would have saved life. The bullet of large calibre and low velocity carried infection and every wound was poisoned. The surgeon will tell you that the modern bullet is humane if such a term can be applied to such a thing. They carry no poisonous germ, they give the minimum shock and no small proportion of wounded men receive and need no other dressing of their wounds than that applied by themselves or their comrades on the firing line.

(4) In spite of all this I know that you will ask, How can it be that when men are armed with weapons that shoot farther, straighter and many more times to the minute than in former times, fewer men in 100,000 can be killed or wounded? The cause is found in the perfection of the weapon itself combined with the physical limitations of the men who use them. In Frederick the Great's army a soldier could fire two aimed shots a minute. He fired them at twenty yards range. At that range the bullet was just as fatal as now and far more certain to hit. He fired at a line of men standing shoulder to shoulder and two, three or four ranks deep. If the musket was held level every bullet found its billet in spite of the smoke. So, in those days and later we find battles where there was one wound to every five shots fired. In some of the engagements of the Franco-Prussian War 100,000 shots were fired to make one hit. As the modern weapon practically operates by fire alone, the very perfection of the arm makes it unnecessary to have the same density as formerly. Where Frederick the Great had 10,000 men

to the mile of front we now sometimes find only 500. If you have ever tried to hold the sights of a rifle upon a target the size of a man 1,000 yards away, or have realized the strain upon the eye and nerve, you will understand why it is that under modern conditions the soldier cannot fire many more, if any, really aimed shots per minute than was done by a soldier of Frederick the Great.

(5) In most of the really decisive battles of past wars, an analysis of the figures will show that a very considerable part of the loss sustained by the defeated side occurred after the defeat became evident. This was equally true up to a certain point after the individual duel element had disappeared. A curious deviation from this heretofore general rule is now becoming apparent. At the battle of Waterloo probably one mile was the greatest distance which at any moment separated the persons of the Duke of Wellington, on the one side, and of Napoleon, on the other, and this distance corresponded closely to that between the main bodies of reserves on the two sides. When one side began to yield it not infrequently happened that the larger part of its reserves had already been absorbed in the conflict. When at this moment the weight of the intact reserves of the victorious side was thrown into the scale it added further disaster to defeat. Its distance from the enemy now beginning to retreat was so short that in a few moments it could be hurled againt the latter's organizations already beginning to dissolve. The retreating infantry were hurried into a state of more or less complete disorganization and were easily swept over by great masses of cavalry.

At the recent battles of Liao Yang and Mukden the opposing commanders were separated by a distance of from twenty-five to thirty miles, each of them being at least twelve or fifteen miles in rear of his own line. If the main reserve of the victorious side were as near as it could be to the point at which the opponent first began to yield, it would require them several hours of fatiguing march to reach that point. Long before this was done the enemy was able to begin a fairly orderly retreat. This is a condition which may be assumed to continue in the future and is another of the many reasons why the perfection of modern arms has shown in their enormously increased range, a decrease in the percentage of loss that would otherwise be expected.

(6) You will note that in a good many of modern battles much

of the loss has been due, not so much to the power of the weapons as to a lack of appreciation of that power on the part of those who use them; that is to say, much of the loss was preventable. In the Franco-Prussian War each side found itself for the first time in presence of an enemy armed with the breech-loading rapid-fire rifle. Each side began the war with formation adapted to former weapons and lost accordingly. So, as that war progressed, the same results were accomplished with a decreasing percentage of casualties. In 1877 the Russians attacked the Turkish positions at Plevna in formations not much different from those employed at Borodino. At Port Arthur General Nogi's men found themselves shut out from that object of their most intense longing, which they had captured from a very different enemy in twenty-four hours ten years before. I think it safe to say that 25,000 out of the total loss in the seven months' siege of Port Arthur were uselessly lost in learning that success depends not upon the reckless bravado of the soldier, but upon the scientific adaptation by the general of the means to the end.

But it is needless to multiply explanations of the sadly obvious fact that in spite of the apparent increasing deadliness of military weapons, nations still can and will wage war. And when they do fight it is not only, as was once the case, with the best appliances of their own, but also with whatever is afforded by an alien civilization. Men who in their youth fought in body armor and with the two-hand sword and the bow and arrow, these same men are now fighting with every explosive product of the chemist's laboratory and have the telegraph, the telephone and the electric searchlight on their firing line. The rational hope of universal and eternal peace does not lie in the material products of our western Christian civilization. Nations that borrow our dynamos to light with electricity the temples of their gods also borrow our magazine rifles and high-power field guns. The peace that we hope for will come when each civilization has absorbed all that there is of essentially good and noble in the other and it will then be the peace which is born, not of fear, but of love.